

AD0661364 SB

# EMOTIONAL HEALTH IN EXTREME AND NORMAL ENVIRONMENTS

E.K. ERIC GUNDERSON

REPORT NUMBER: 66-23



NAVY MEDICAL

NEUROPSYCHIATRIC RESEARCH UNIT

SAN DIEGO, CALIFORNIA 92152

20050718037

BUREAU OF MEDICINE AND SURGERY NAVY DEPARTMENT

WASHINGTON, D.C. 20390



**INTERNATIONALER KONGRESS FÜR ARBEITSMEDIZIN**  
**INTERNATIONAL CONGRESS ON OCCUPATIONAL HEALTH**  
**CONGRÈS INTERNATIONAL DE MEDECINE DU TRAVAIL**

Wien — Vienna — Vienne      19—24 September 1966

**PROCEEDINGS**

**SEPARATUM**

## EMOTIONAL HEALTH IN EXTREME AND NORMAL ENVIRONMENTS

E. K. ERIC GUNDERSON AND RANSOM J. ARTHUR

The incidence and etiology of emotional ill health is of obvious importance and concern to physicians and psychologists in industrial and military settings. The enormous burden that mental illness and lesser forms of emotional ill health impose upon society and the individual are too well-known to bear repeating here. The traditional emphasis upon early childhood experiences as primary determinants of adult personality and behavior has given way in recent years to the broader view that social and environmental factors play an important part in the stimulation and expression of emotional symptomatology.

The studies summarized in this paper were designed to test the proposition that emotional ill health is importantly related to cultural background, personal needs, occupational roles, and persistent environmental stresses. It is plausible that relationships between personal needs or occupational roles and increases in symptoms may appear only under extreme environmental conditions or prolonged stress. Antarctic scientific stations have been utilized as natural laboratories for the study of human adaptation to extreme environments.

Emotional symptoms can be measured in various ways, including self-report questionnaires. The principal self-report instruments used in our studies have been the Cornell Medical Index-Health Questionnaire (CMI) and its derivatives. The CMI, which has been extensively used in the United States and elsewhere in clinical and epidemiological studies, consists of 195 simply worded questions to be answered yes or no. Each yes response reflects the presence of a symptom or disorder as seen by the subject. A closely related symptom questionnaire, The List of Common Symptoms, was employed in Antarctic studies. This questionnaire consists of 49 items which are virtually identical in content to CMI items but answers are given on a 4-point scale ranging from no complaint to severe complaint. A third test instrument, the Health Opinion Survey, is an abbreviated form of the Cornell Medical Index consisting of 20 items with response given on a 3-point scale.

The List of Common Symptoms questionnaires were administered to several Antarctic groups on three occasions during each of the two years of the International Geophysical Year. The first testing took place before the Antarctic winter, the second testing occurred at midwinter, after three to four months of isolation, and the final testing took place at the end of the winter period. The most prevalent symptoms at midwinter in both expeditions were sleeping disturbances (difficulty falling asleep or staying asleep, waking up at night, and feeling tired during the day) and depression (feeling blue and feeling lonely). Headaches and feeling easily annoyed or irritated also were reported frequently both years. Changes in specific symptoms from prewinter to midwinter were evaluated by means of the sign test in which positive and negative changes on the 4-point response scale were tabulated. In the first expedition the following symptoms showed significant shifts toward increasing severity from prewinter test administrations: difficulty in falling asleep or staying asleep, waking up at night, bad dreams, feeling blue, feeling lonely, easily annoyed or irritated, feeling critical of others, headaches, feeling tired during the day, and pains in the lower back. In the second expedition the most marked changes occurred in the same symptoms that differed significantly from prewinter to midwinter in the first

expedition, that is, items pertaining to sleep disturbances, depression, and irritability.

It was clear that emotional disturbances and symptomatic complaints tended to increase in healthy individuals exposed to the prolonged restricted stimulation of the Antarctic situation. These symptoms appeared psychologically unpleasant and presumably would have a deleterious effect upon work effectiveness and social adjustment. This assumption was supported by significant correlations between symptoms scales -- constructed from highly intercorrelated questionnaire items and labeled Anxiety, Depression, Aggression, and Insomnia -- and measures of individual motivation, feelings of usefulness, and group compatibility obtained near the end of winter.

Additional studies of symptom incidence were conducted during the most recent Antarctic expeditions. Antarctic living and working conditions generally have improved since the IGY period, and so it was anticipated that symptom incidence might diminish. This expectation was not realized because the incidence of symptoms was consistently higher for members of recent expeditions.

Navy enlisted occupational groups reported more symptomatology during all expeditions than did civilian meteorologists and scientists, reflecting the relationship between occupational roles and emotional symptoms. Men in Navy construction occupations (carpenters, plumbers, electricians, and mechanics) reported more insomnia at midwinter -- the period of least activity for this group -- than did other groups.

In all four expeditions studied, older members had fewer symptoms. During the early expeditions, those with more education tended to report fewer symptoms. Level of father's education also was negatively correlated with symptom scores. Truancy from school or running away from home during school years related to midwinter and late winter symptoms.

Relationships of birth order to the symptoms scales were of special interest in that the results seem to support Schachter's prediction that first-born children respond differently to stress than do other individuals. Schachter specifically hypothesized that first-borns will seek affiliation or closeness to others under anxiety arousing conditions (Schachter, 1959). The data shown in Table 1, based upon responses of military personnel in two expeditions, certainly appear consistent with the notion that first-borns become more anxious under mild but prolonged stress than do others.

Table 1

Correlations between the "Oldest Child" Category and Symptom Scores

	<u>Early Winter</u>	<u>Late Winter</u>	<u>Change</u>
Anxiety	-15 <sup>a</sup>	11	24*
Depression	-16	17	28*
Aggression	-11	25*	30*
Insomnia	-02	37*	34*

\*Correlations significant beyond .05 level.

<sup>a</sup>Product-moment correlations; decimals are omitted. N equals 78.

Men in the "Oldest Child" category tended to have low symptom scores at early winter as shown by the negative signs in Table 1. At the end of winter, however, men in the "Oldest Child" category generally had higher symptom scores than did other individuals, particularly on the Insomnia Scale. Changes (increases) in scores on all four of the symptoms scales significantly correlated with being an oldest child.

Personality traits of military personnel most susceptible to the development of symptoms through the Antarctic winter are illustrated by the following test items which were among the most highly correlated with a Total Symptoms score derived by summing all scale scores for both administrations: "Life usually hands me a pretty raw deal," "A person is better off if he doesn't trust anyone," and "I have had more than my share of things to worry about." Subjects with high symptom scores tended to agree with the foregoing statements and to disagree with the statement, "Most of the time I feel happy."

The individual prone to develop symptoms in the Antarctic prefers the following personality traits in close friends: sympathetic, sentimental, confiding, praising, and warm. The person who develops symptoms also prefers his friends to be dignified. Individuals who describe themselves as hard, stubborn, blunt, and rough in manner tend not to develop symptoms.

Thus, a pattern of social and personality characteristics emerges which when given proper weights by means of linear multiple regression methods provides a substantial degree of prediction of individual differences in susceptibility to emotional distress in one extreme environment.

During one expedition Anxiety, Depression, and Aggression scores derived from the List of Common Symptoms questionnaire were found to correlate substantially ( $p < .001$ ) with an independent measure of Emotional Changes derived from symptom check-list records accumulated by station leaders (including a medical officer). The Insomnia Scale was significantly correlated ( $p < .001$ ) with a Medical Complaints Index derived from the same symptom check list maintained by the station medical officer. In this paper space does not permit detailed discussion of forms of symptom measurement other than self-report questionnaires utilized in the Antarctic studies, namely, medical and behavioral records by station leaders and ratings of emotional stability by supervisors and peers. These measures are described elsewhere (Gunderson, 1966).

Are these relationships between social and demographic factors and emotional symptoms tenable for men not involved in arduous and stressful situations? Comparative data are available for young men of similar age and for selected psychiatric patients. These data are from responses on the Cornell Medical Index and its abbreviated derivative, the Health Opinion Survey. The CMI can sharply distinguish patients from non-patients. For patients, level of education is negatively related to CMI scores, but age, except for 17-year olds, is unrelated. For non-patients, education was negatively correlated with amount of symptomatology as reflected in CMI scores. Men with some college education had much lower scores than other groups. Age tended to have a curvilinear relationship with CMI scores in that men in the 22-23 age group scored somewhat higher than younger and older groups. Similarly, third class petty officers tended to have higher CMI scores than men of higher and lower rank. Single men scored much lower than married, separated, or divorced individuals.

A further opportunity to examine correlates of emotional ill

health was afforded by study of approximately 800 psychiatric out-patients tested with the Health Opinion Survey (HOS) at five Navy out-patient clinics. The HOS provides a score based upon 20 symptoms questions answered on 3-point scales: never, sometimes, and often. The population tested consisted of a heterogeneous sample, providing large variations in demographic and social characteristics and in the amount of symptomatology present. In this population age, rank, intelligence, and education were negatively correlated ( $p < .001$ ) with emotional symptomatology as indicated by HOS scores but birth order was unrelated.

Demographic and social background factors, notably age and education, tend to have constant relationships to the amount of symptomatology expressed, regardless of variations in environmental conditions. Under the conditions of prolonged group isolation and confinement experienced at Antarctic scientific stations, a number of relationships appeared between social background or personality characteristics and emotional symptoms which were not present under less extreme conditions. We have attempted to demonstrate that susceptibility to emotional disturbances is importantly related to and predictable from a variety of personal and social characteristics, including occupational role, particularly in an extreme environment.

#### References

- Gunderson, E. K. E. (1966), Adaptation to Extreme Environments: Prediction of Performance. Report Number 66-17, U.S. Navy Medical Neuropsychiatric Research Unit, San Diego, California 92152.
- Schachter, S. (1959), The Psychology of Affiliation: Experimental Studies of the Sources of Gregariousness. Stanford University Press, Stanford, California.

UNCLASSIFIED  
Security Classification

DOCUMENT CONTROL DATA - R&D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author) Navv Medical Neuropsychiatric Research Unit San Diego, California 92152		2a. REPORT SECURITY CLASSIFICATION Unclassified
		2b. GROUP
3. REPORT TITLE Emotional health in extreme and normal environments		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates)		
5. AUTHOR(S) (Last name, first name, initial) GUNDERSON, E. K. Eric		
6. REPORT DATE 1967	7a. TOTAL NO. OF PAGES 4	7b. NO. OF REFS 2
8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S) 66-23	
b. PROJECT NO. MF022.01.03-9001		
c.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
d.		
10. AVAILABILITY/LIMITATION NOTICES  (1) Qualified requestors may obtain copies of this report from DDC		
11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Bureau of Medicine and Surgery Department of the Navy Washington, D. C. 20390	
13. ABSTRACT Certain demographic and social background factors, notably age and education, tend to have constant relationships to the amount of symptomatology expressed, regardless of variations in environmental conditions. Under the conditions of prolonged group isolation and confinement experienced at Antarctic scientific stations, a number of relationships appeared between social background or personality characteristics and emotional svmpptoms which were not present under less extreme conditons. We have attempted to demonstrate that susceptibility to emotional disturbances is importantly related to and predictable from specific personal and social characteristics, including occupational role, and that certain relation-ships only appear after prolonged mild stress.		

UNCLASSIFIED

## Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Social background environmental stress emotional symptoms occupational role						

## INSTRUCTIONS

1. **ORIGINATING ACTIVITY:** Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization (*corporate author*) issuing the report.

2a. **REPORT SECURITY CLASSIFICATION:** Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

2b. **GROUP:** Automatic downgrading is specified in DoD Directive 5200.10 and Armed Forces Industrial Manual. Enter the group number. Also, when applicable, show that optional markings have been used for Group 3 and Group 4 as authorized.

3. **REPORT TITLE:** Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a meaningful title cannot be selected without classification, show title classification in all capitals in parenthesis immediately following the title.

4. **DESCRIPTIVE NOTES:** If appropriate, enter the type of report, e.g., interim, progress, summary, annual, or final. Give the inclusive dates when a specific reporting period is covered.

5. **AUTHOR(S):** Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. **REPORT DATE:** Enter the date of the report as day, month, year; or month, year. If more than one date appears on the report, use date of publication.

7a. **TOTAL NUMBER OF PAGES:** The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. **NUMBER OF REFERENCES:** Enter the total number of references cited in the report.

8a. **CONTRACT OR GRANT NUMBER:** If appropriate, enter the applicable number of the contract or grant under which the report was written.

8b, 8c, & 8d. **PROJECT NUMBER:** Enter the appropriate military department identification, such as project number, subproject number, system numbers, task number, etc.

9a. **ORIGINATOR'S REPORT NUMBER(S):** Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

9b. **OTHER REPORT NUMBER(S):** If the report has been assigned any other report numbers (*either by the originator or by the sponsor*), also enter this number(s).

10. **AVAILABILITY/LIMITATION NOTICES:** Enter any limitations on further dissemination of the report, other than those

imposed by security classification, using standard statements such as:

- (1) "Qualified requesters may obtain copies of this report from DDC."
- (2) "Foreign announcement and dissemination of this report by DDC is not authorized."
- (3) "U. S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through \_\_\_\_\_."
- (4) "U. S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through \_\_\_\_\_."
- (5) "All distribution of this report is controlled. Qualified DDC users shall request through \_\_\_\_\_."

If the report has been furnished to the Office of Technical Services, Department of Commerce, for sale to the public, indicate this fact and enter the price, if known.

11. **SUPPLEMENTARY NOTES:** Use for additional explanatory notes.

12. **SPONSORING MILITARY ACTIVITY:** Enter the name of the departmental project office or laboratory sponsoring (*paying for*) the research and development. Include address.

13. **ABSTRACT:** Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

It is highly desirable that the abstract of classified reports be unclassified. Each paragraph of the abstract shall end with an indication of the military security classification of the information in the paragraph, represented as (TS), (S), (C), or (U).

There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

14. **KEY WORDS:** Key words are technically meaningful terms or short phrases that characterize a report and may be used as index entries for cataloging the report. Key words must be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location, may be used as key words but will be followed by an indication of technical context. The assignment of links, roles, and weights is optional.

UNCLASSIFIED

Security Classification